

WHAT IS CLAIMED IS:

1 1. A base station controller for adaptively
2 configuring the structure of a cell served by said base
3 station controller, said cell having a plurality of
4 mobile stations located therein and a base transceiver
5 station associated therewith, said base transceiver
6 station having at least two carrier frequencies
7 associated therewith, said base station controller
8 comprising:

9 measurement logic adapted to determine a
10 respective distance of each of said mobile stations
11 involved in a call connection within said cell from
12 said base transceiver station;

13 first comparison logic adapted to compare each
14 said respective distance to a distance threshold to
15 determine a number of said mobile stations having said
16 respective distance less than or equal to said distance
17 threshold;

18 second comparison logic adapted to perform a
19 comparison of said number to a channel threshold; and

20 configuration logic adapted to switch between an

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21 overlaid/underlaid sub-cell structure having at least
22 one of said at least two carrier frequencies serving
23 only a portion of said cell and a normal cell structure
24 having all of said at least two carrier frequencies
25 serving the entire area of said cell based on the
26 results of said comparison.

1 2. The base station controller of Claim 1,
2 wherein said channel threshold is a number of traffic
3 channels in use.

1 3. The base station controller of Claim 2,
2 wherein said configuration logic is adapted to switch
3 to said overlaid/underlaid sub-cell structure when the
4 results of said comparison indicate that said number of
5 said mobile stations having said respective distance
6 less than or equal to said distance threshold is
7 greater than or equal to said channel threshold.

1 4. The base station controller of Claim 1,
2 wherein said channel threshold is a number of traffic
3 channels available.

1 5. The base station controller of Claim 4,
2 wherein said configuration logic is adapted to switch
3 to said overlaid/underlaid sub-cell structure when the
4 results of said comparison indicate that said number of
5 said mobile stations having said respective distance
6 less than or equal to said distance threshold is less
7 than or equal to said channel threshold.

1 6. The base station controller of Claim 1,
2 further comprising:

3 a timer, said measurement logic being adapted to
4 begin measuring each said respective distance upon the
5 expiration of said timer.

1 7. The base station controller of Claim 1,
2 wherein each said respective distance is a radius
3 around said base transceiver station, said distance
4 threshold being an additional radius around said base
5 transceiver station.

1 8. The base station controller of Claim 1,
2 wherein each said respective distance is a specific
3 distance from said base transceiver station, said
4 distance threshold being a radius around said base
5 transceiver station.

1 9. The base station controller of Claim 1,
2 wherein each said respective distance is a specific
3 distance from said base transceiver station, said
4 distance threshold being a function describing the
5 shape of an overlaid sub-cell of said
6 overlaid/underlaid sub-cell structure.

1 11. The base station controller of Claim 1,
2 wherein said channel threshold is based on the number
3 of traffic channels associated with at least two of
4 said at least two carrier frequencies.

1 12. A telecommunications system for adaptively
2 configuring the structure of a cell within a cellular
3 network, said cell having a plurality of mobile
4 stations located therein, said telecommunications
5 system comprising:

6 a base transceiver station within said cell in
7 wireless communication with said plurality of mobile
8 stations, said base transceiver station having at least
9 two carrier frequencies associated therewith; and

10 a base station controller connected to said base
11 transceiver station, said base station controller being
12 adapted to measure a respective distance of each of
13 said mobile stations involved in a call connection
14 within said cell from said base transceiver station,
15 compare each said respective distance to a distance
16 threshold to determine a number of said mobile stations
17 having said respective distance less than or equal to
18 said distance threshold, perform a comparison of said
19 number to a channel threshold and switch between an
20 overlaid/underlaid sub-cell structure having at least
21 one of said at least two carrier frequencies serving

22 only a portion of said cell and a normal cell structure
23 having all of said at least two carrier frequencies
24 serving the entire area of said cell based on the
25 results of said comparison.

1 13. The telecommunications system of Claim 12,
2 wherein said channel threshold is a number of traffic
3 channels in use.

1 14. The telecommunications system of Claim 13,
2 wherein said base station controller is adapted to
3 switch to said overlaid/underlaid sub-cell structure
4 when the results of said comparison indicate that said
5 number of said mobile stations having said respective
6 distance less than or equal to said distance threshold
7 is greater than or equal to said channel threshold.

1 15. The telecommunications system of Claim 12,
2 wherein said channel threshold is a number of traffic
3 channels available.

1 16. The telecommunications system of Claim 15,
2 wherein said base station controller is adapted to
3 switch to said overlaid/underlaid sub-cell structure
4 when the results of said comparison indicate that said
5 number of said mobile stations having said respective
6 distance less than or equal to said distance threshold
7 is less than or equal to said channel threshold.

1 17. The telecommunications system of Claim 12,
2 wherein said base station controller further comprises
3 a timer, said base station controller being adapted to
4 begin measuring each said respective distance upon the
5 expiration of said timer.

1 18. The telecommunications system of Claim 12,
2 wherein each said respective distance is a radius
3 around said base transceiver station, said distance
4 threshold being an additional radius around said base
5 transceiver station.

1 19. The telecommunications system of Claim 12,
2 wherein each said respective distance is a specific
3 distance from said base transceiver station, said
4 distance threshold being a radius around said base
5 transceiver station.

1 20. The telecommunications system of Claim 12,
2 wherein each said respective distance is a specific
3 distance from said base transceiver station, said
4 distance threshold being a function describing the
5 shape of an overlaid sub-cell of said
6 overlaid/underlaid sub-cell structure.

1 21. The telecommunications system of Claim 12,
2 wherein said base transceiver station has at least two
3 transceiver units associated therewith, each of said at
4 least two transceiver units having a respective one of
5 said at least two carrier frequencies associated
6 therewith.

Patent Application
Docket #27943/00385
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FIRST DRAFT

1 22. The telecommunications system of Claim 21,
2 wherein said base station controller is adapted to
3 switch to said overlaid/underlaid sub-cell structure by
4 reducing the power to at least one of said at least two
5 transceiver units.

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23. A method for adaptively configuring the structure of a cell served by a base station controller, said cell having a plurality of mobile stations located therein and a base transceiver station associated therewith, said base transceiver station having at least two carrier frequencies associated therewith, said method comprising the steps of:

determining a respective distance of each of said mobile stations involved in a call connection within said cell from said base transceiver station;

comparing each said respective distance to a distance threshold to determine a number of said mobile stations having said respective distance less than or equal to said distance threshold;

performing a comparison of said number to a channel threshold; and

switching between an overlaid/underlaid sub-cell structure having at least one of said at least two carrier frequencies serving only a portion of said cell and a normal cell structure having all of said at least two carrier frequencies serving the entire area of said

22 cell based on said step of performing.

1 24. The method of Claim 23, wherein said channel
2 threshold is a number of traffic channels in use, said
3 step of switching further comprising the step of:

4 switching to said overlaid/underlaid sub-cell
5 structure when the results of said comparison indicate
6 that said number of said mobile stations having said
7 respective distance less than or equal to said distance
8 threshold is greater than or equal to said channel
9 threshold.

1 25. The method of Claim 23, wherein said channel
2 threshold is a number of traffic channels available,
3 said step of switching further comprising the step of:

4 switching to said overlaid/underlaid sub-cell
5 structure when the results of said comparison indicate
6 that said number of said mobile stations having said
7 respective distance less than or equal to said distance
8 threshold is less than or equal to said channel
9 threshold.

1 26. The method of Claim 23, further comprising
2 the steps of:

3 initializing a timer, said step of measuring each
4 said respective distance being performed upon the
5 expiration of said timer.

1 27. The method of Claim 23, wherein said base
2 transceiver station has at least two transceiver units
3 associated therewith, each of said at least two
4 transceiver units having a respective one of said at
5 least two carrier frequencies associated therewith,
6 said step of switching further comprising the step of:

7 switching to said overlaid/underlaid sub-cell
8 structure by reducing the power to at least one of said
9 at least two transceiver units.